



## Taxonomy of the genus *Craspedomerus* Bernhauer, 1911 (Coleoptera: Staphylinidae: Philonthina) from China

LIANG LI<sup>1,2</sup> & HONG-ZHANG ZHOU<sup>1,3</sup>

<sup>1</sup>Key Laboratory of Zoological Systematics and Evolution, Institute of Zoology, Chinese Academy of Sciences, 1 Beichen West Rd., Chaoyang District, Beijing 100101, P. R. China.

<sup>2</sup>Graduate School of the Chinese Academy of Science, 19 Yuquan Rd., Shijingshan District, Beijing 100039, P. R. China.

<sup>3</sup>Corresponding author E-mail: zhouhz@ioz.ac.cn

### Abstract

Three new species of the genus *Craspedomerus* from China are described and illustrated: *C. giganteus* Li & Zhou **sp. n.** from Sichuan, *C. gongshanus* Li & Zhou **sp. n.** from Yunnan and *C. zhangii* Li & Zhou **sp. n.** from Tibet. Four species are reported for the first time from China: *C. sinetuber* (Coiffait, 1977a) from Tibet, *C. cyanipennis* Scheerpeltz, 1976b, *C. ganeshensis* Coiffait, 1983 and *C. glenoides* (Schubert, 1908) from Yunnan. These four and two additional species previously recorded from China (*C. beckeri* Bernhauer, 1934 and *C. violaceipennis* Cameron, 1928) are redescribed and illustrated. Sensory peg setae located on the underside of the paramere of the aedeagus of all nine Chinese species are compared using scanning electron microscopy (SEM) and the result shows that this character is useful for species identification. A key to the Chinese species of *Craspedomerus* is presented and geographical distribution of all sixteen species of *Craspedomerus* is mapped.

**Key words:** Coleoptera, Staphylinidae, Staphylininae, Philonthina, *Craspedomerus*, new species, China

### Introduction

Bernhauer (1911) established the genus *Craspedomerus* and designated *Philonthus glenoides* Schubert, 1908 from India as the type species. For this genus, he erected the subtribe Craspedomerina (originally spelled as Craspedomeri) in the tribe Staphylinini of the subfamily Staphylininae. The genus, as well as the subtribe, was established based on the presence of an additional oblique line connecting the superior and inferior lines of the pronotal hypomeron (Bernhauer 1911, 1927; Cameron 1932; Moore 1960; Scheerpeltz 1976a; Newton & Thayer 1992; Smetana 1995). This line, however, was considered recently as a ventral-deflected part of the superior line rather than a separate line. Based on that, *Craspedomerus* was moved to the subtribe Philonthina Kirby, 1837 (Smetana & Davies 2000), as originally suggested by Hayashi (1997), and the subtribe Craspedomerina was synonymized with Philonthina (Smetana & Davies 2000). Herman (2001) and Smetana (2004) accepted this taxonomic treatment, which we follow in this paper.

The genus *Craspedomerus* is a poorly studied group and until now a taxonomic revision was lacking. The aedeagi of different species are strikingly similar to each other, often showing only proportional differences (Schillhammer 1998); thus, species identification is very difficult, especially for some closely related species. Until now, 13 species of *Craspedomerus* have been reported from the Palaearctic and Oriental Regions (Bernhauer 1911, 1934; Cameron 1926, 1928, 1932; Coiffait 1976, 1977ab, 1982ab, 1983; Scheerpeltz 1965, 1976ab; Schillhammer 1992; Herman 2001; Smetana 2004). Of all the known species, only two have been reported from China: *C. beckeri* Bernhauer, 1934 from Sichuan and *C. violaceipennis* Cameron, 1928 from Tibet.

In this paper, three new species of *Craspedomerus* from China are described and illustrated: *C. giganteus* Li & Zhou **sp. n.** from Sichuan, *C. gongshanus* Li & Zhou **sp. n.** from Yunnan and *C. zhangii* Li & Zhou **sp. n.**

from Tibet. Four species are reported for the first time from China: *C. sinetuber* (Coiffait, 1977a) from Tibet, *C. cyanipennis* Scheerpeltz, 1976b, *C. ganeshensis* Coiffait, 1983 and *C. glenoides* (Schubert, 1908) from Yunnan. Thus, nine species of the genus *Craspedomerus* are known in total from China, and the world fauna of the genus is increased to sixteen species. Six previously described species now known from China: *C. beckeri*, *C. cyanipennis*, *C. ganeshensis*, *C. glenoides*, *C. sinetuber* and *C. violaceipennis* are redescribed and illustrated. Sensory peg setae located on the underside of the paramere of aedeagus are compared for nine Chinese species using scanning electron microscopy (SEM) and the result shows that this character is useful for species identification. A key to the Chinese species of *Craspedomerus* is presented and geographical distribution of all sixteen species of *Craspedomerus* is mapped.

## Materials and methods

Specimens were relaxed in warm water (60–70°C) for about 7–10 hours, then cleared in 10% KOH for 5 minutes, and transferred in 75% alcohol. Cleared specimens were dissected to observe morphological details of the 8<sup>th</sup>–10<sup>th</sup> abdominal segments and male aedeagus. After examination, the body parts were stored permanently in glycerin for future studies. Observation and drawing were done under a compound microscope (Zeiss). For scanning electron microscopy (SEM) studies, specimens were fixed in 4% formaldehyde, post-fixed in 1% OsO<sub>4</sub>, dehydrated through ethanol series and acetone, and dried to critical point. The specimens were coated with gold and examined with a Hitachi S-570 scanning electron microscope at an accelerating voltage of 15 KV.

This study was mainly based on the material deposited in IZ-CAS (Institute of Zoology, Chinese Academy of Sciences, Beijing, China). Additional depositories are listed below:

BMNH	The Natural History Museum, London, UK (R. G. Booth)
CSB	Private collection of M. Schülke, Berlin, Germany
CSO	Private collection of A. Smetana, Ottawa, Canada
FMNH	Field Museum of Natural History, Chicago, USA (A. F. Newton & J. H. Boone)
NMW	Naturhistorisches Museum Wien, Austria (H. Schillhammer)

The following abbreviations are used in the text with the measurement in millimeters (mm):

AW	Abdomen width (the width of the abdomen at its widest point)
BL	Body length (from the anterior margin of the head to the posterior margin of styli of tergite IX)
CEL	Eyes length (from the anterior margin to the posterior margin of the eyes, viewed from above)
EL	Elytron length (from the anterior margin to the posterior margin of the elytron)
EW	Width of both elytra combined (the width of the elytra at their widest point)
HL	Head length (from the anterior margin of the head to the posterior margin of tempora, labrum and mouthparts not included)
HPL	Head and pronotum length, combined (from the anterior margin of the head to the posterior margin of pronotum, neck included)
HW	Head width (the width of the head at its widest point, eyes included)
PL	Pronotum length (from the anterior margin to the posterior margin of the pronotum)
PW	Pronotum width (the width of the pronotum at its widest point)
TL	Tempora length (in dorsal view, from the posterior margin of the eyes to an imaginary line going through the points where the tempora meet the neck)

Species distribution data were compiled in a Microsoft Access database using both published records and specimen labels. Records without geographic coordinates were georeferenced using online gazetteers. Distribution map was produced using ArcView 3.2.

## Taxonomy

### Genus *Craspedomerus* Bernhauer, 1911

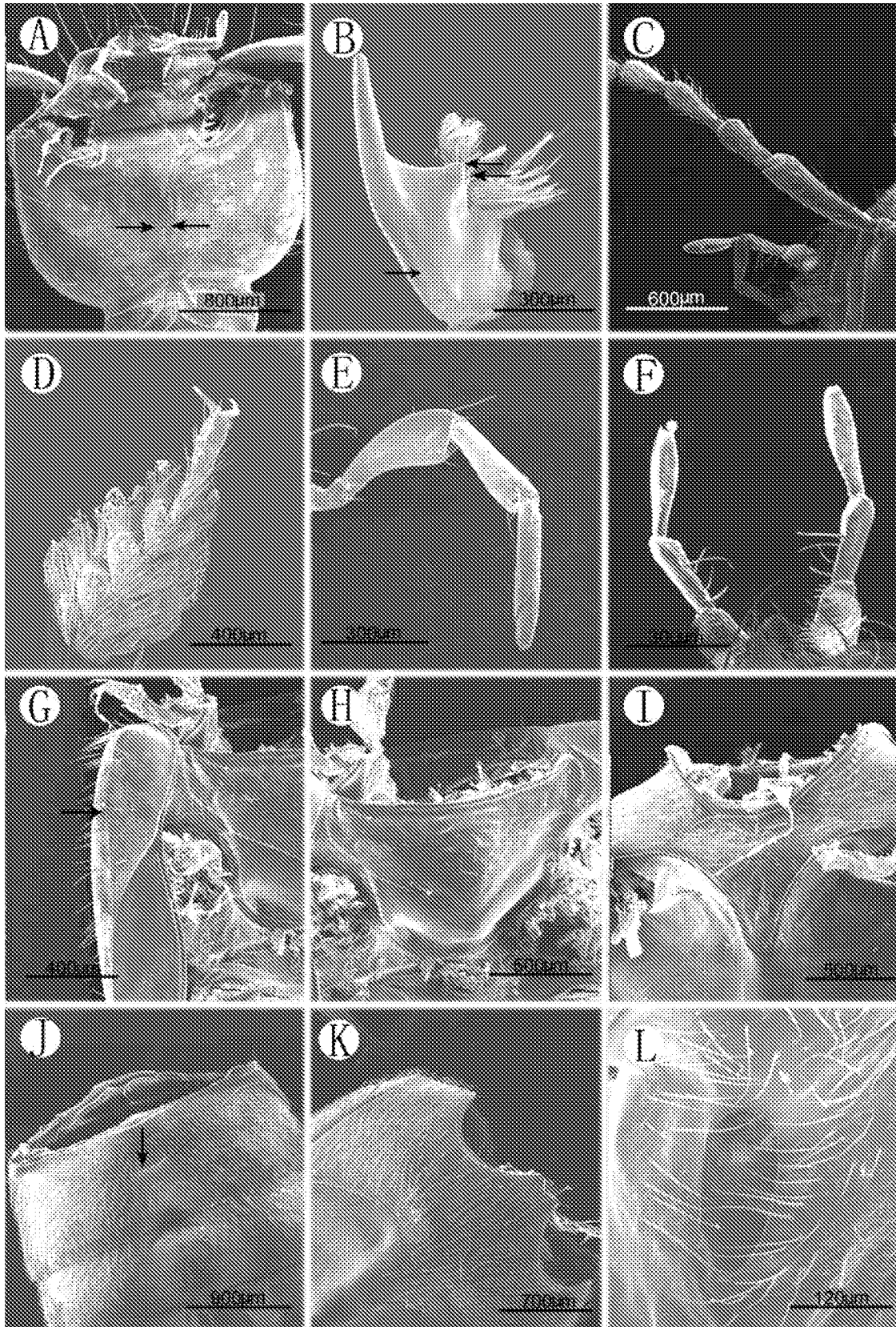
Bernhauer, 1911: 88 (genus description); Bernhauer & Schubert, 1914: 400 (world catalog); Winkler, 1925: 387 (catalog for Palaearctic region); Cameron, 1925: 71 (catalog of Indian species); 1932: 248 (key to species of British India); Scheerpeltz, 1933: 1410 (world catalog supplement); Blackwelder, 1952: 110 (type species); Moore, 1960: 100 (key to genera); Scheerpeltz, 1976b: 148 (key to species of Himalayan region); Schillhammer, 1998: 148 (characters); Hayashi, 2000: 23 (notes on empodial setae); Smetana & Davies, 2000: 13 (characters); Herman, 2001: 2582 (world catalog); Smetana, 2004: 632 (catalog for Palaearctic region); Schillhammer, 2005: 184 (characters).

**Type species.** *Philonthus glenoides* Schubert, 1908; fixed by monotypy.

**Diagnosis.** The genus *Craspedomerus* can be easily distinguished from the other genera in the subtribe Philonthina by the combination of the following character states: maxillary palpi long, with 4<sup>th</sup> segment cylindrical and distinctly longer than penultimate segment (Fig. 1E); labial palpi long, with 3<sup>th</sup> segment slightly longer than 2<sup>nd</sup> segment (Fig. 1F); antennae moderately long, basal three segments polished, bearing only sparse strong setae, 3<sup>rd</sup> segment much longer than 2<sup>nd</sup>, the following segments gradually decreasing in length, but all longer than wide; first four segments of front tarsus in both sexes at least slightly dilated, with some modified pale setae ventrally (Fig. 1F); pronotum densely and finely punctate, narrowly impunctate along midline; superior line of pronotal hypomeron deflexed under third anterior margin of pronotum and extended (from point where it bends ventrad) into slightly crenulate ridge that forms the additional “fake” lateral line (Fig. 1G); abdomen with tergites III–V bearing two basal lines (Fig. 2H); basal line of sternite III arcuately extended posteriad in middle (Fig. 1J); sternite VIII of male with moderately wide, obtusely triangular medio-apical emargination; sternite IX of male genital segment with basal portion distinctly asymmetrical; aedeagus with median lobe distinctly exceeding paramere, evenly narrowed into subacute apex; paramere bifurcate apically, Y-shaped (Fig. 2F), underside of each branch with group of rather small, irregularly arranged sensory peg setae (Figs. 12 A–I).

### Key to the Chinese species of *Craspedomerus*

1. Elytra varied metallic blue, violaceous, purple or dark purple ..... 2
- Elytra fusco-testaceous ..... 7
2. Elytra purple with shoulders, posterior margins and suture markedly yellow ..... *C. zhangi* Li & Zhou **sp. n.**
- Elytra entirely metallic blue, violaceous, purple or dark purple ..... 3
3. Abdomen entirely black; eyes very large, 1.30–1.60 times as long as tempora ..... *C. sinetuber* (Coiffait)
- Abdomen at least partly reddish-yellow; eyes small, 0.67–0.92 times as long as tempora ..... 4
4. Antennae entirely black brown ..... 5
- Antennae black with 8<sup>th</sup>–10<sup>th</sup> segments yellow ..... 6
5. Body very large (HPL: 5.47–5.71); pronotum with profound microsculpture of mesh .....  
..... *C. giganteus* Li & Zhou **sp. n.**
- Body small (HPL: 4.08–4.32); pronotum with profound microsculpture of long waves .....  
..... *C. gongshanus* Li & Zhou **sp. n.**
6. Pronotum with strongly violaceous reflex; femora dark ..... *C. cyanipennis* Scheerpeltz
- Pronotum with bronze-green reflex; femora reddish ..... *C. violaceipennis* Cameron
7. Antennae black with 8<sup>th</sup>–11<sup>th</sup> segments to various extent yellow ..... *C. beckeri* Bernhauer
- Antennae black with 7<sup>th</sup>–11<sup>th</sup> segments yellow ..... 8
8. Elytra with a dark transverse fascia across the middle; tergite VII entirely reddish-yellow .... *C. glenoides* (Schubert)
- Elytra without a dark transverse fascia across the middle; tergite VII with basal third portion black .....  
..... *C. ganeshensis* Coiffait



**FIGURE 1.** Scanning electron micrographs of *Craspedomerus giganteus* Li & Zhou **sp. n.** A, underside of head, showing gula (arrows), ventral view; B, left mandible, showing dorsolateral groove and two large teeth (arrows); C, basal three segments of antennae; D, male protarsus, dorsal view; E, maxillary palpus; F, labial palpi; G, pronotal hypomeron, showing “fake” lateral line (arrow); H, prosternum, ventral view; I, mesoventrite, without transverse ridge, ventral view; J, sternite III, showing basal line (arrow), ventral view; K, metaventricle, ventral view; L, osmeterium, dorsal view.

